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SOURCE Der Volkswirt, Vol VI, No 51/52, 1952.WEST GERMAN COAL-MINING INDUSTRY

The bituminous coal mines of the Federal Republic produced 123 million tons in 1952. This is about 6 million tons above the 1936 production. However, the gap between domestic production and requirements is best shown by the fact that nearly 7.5 million tons of coal had to be imported from the US during 1952. This is the more notable since the Federal Republic by nature is not a coal-importing country and the German coal-mining industry has always been a heavy exporter, while imports used to be quite negligible. If the extremely high industrial production level is to be maintained in 1953, the Federal Republic will have to continue importing coal from the US.

Output per man per shift underground in bituminous coal mines is at present about 1.48 tons. That is far below the maximum of 2.1 tons reached in 1936. However, if all circumstances are considered, the question of whether the high prewar production level in underground mining operations can ever be reached again can hardly be answered in the affirmative. The fact that the prevailing conditions are entirely different from those of 1936 is frequently overlooked. Output per man per shift had already decreased to 1.9 tons in 1938. The drop in output, which thus had already started before World War II, has several causes. These causes have influenced each other, but the coal-mining industry itself is in no position to eliminate them.

It must first be borne in mind that the labor force in 1936 was capable of the highest output. The age-group structure of mining labor at that time was more favorable than ever before and has never been as favorable since. The total coal production of 116,950,000 tons in 1936 was achieved by an underground labor force of 177,385 men. The especially high production of 1938, which reached almost 137 million tons, required 228,800 workers underground. Thus, some of the production increase of the prewar years was accomplished by the employment of additional miners. But in 1951, the bituminous coal-mining industry required 283,370 underground workers, and the production increase in 1952 could be accomplished only by still another

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increase in the labor force. Thus, at the end of November 1952, the bituminous coal mines of the Federal Republic employed 326,000 underground miners. The figures of labor force versus production show the discrepancy between the prewar and the postwar situation very clearly. They point up the manpower and the age-group problem. It is certain that the mining industry does not yet have the experienced labor force of the prewar years. The high labor turnover is proof of this. There are, however, still other factors.

In the period 1936 - 1938, output had reached its highest level. Rationalization of operation by consolidation of installations had been effective. Opening and forewinning underground was normal. Available capacity was not being utilized to the utmost. Thus, it was very easy to expand production at will. The seams were thicker than they are today and the mines were less deep. Precisely these two factors are often not considered today. At present, the average seam thickness in the West German mines is only 90 centimeters, which means that operations are more difficult. The same obtains for the depth of the mines. It is increasing by 6 to 8 meters per year. The average depth of the pits in the bituminous coal mines of the Ruhr has reached 750 meters. Of the 155 producing collieries, 10 are already going below 1,000 meters, and 64 are producing at depths between 700 and 900 meters. The temperature in a mine increases roughly by one degree centigrade per 27-33 meters of depth. For working sites with temperatures above 28 degrees centigrade, the mining authorities prescribe shorter working hours.

Another problem is that of the uncommonly high labor turnover. During the first three quarters of 1952 no less than 46,600 miners quit their jobs. During the same period, a total of 49,500 new miners was engaged. In the period 1949 - 1951, the bituminous coal mines had a total of 557,000 new employees, while during the same period 387,000 workers left again. Experience has shown that half of the new employees leave during their first year in the mines.

The new miner is paid full wages from the first day of his employment, while his work does not become productive until about 3 months later. Figuring on the basis of a miner's average monthly wages of 400 DM (Deutsche marks (west?)), we find that the mines must spend about 1,200 DM to get one productive worker. But if this worker leaves again after his 3-months training period, this money is wasted and so is the work of the experienced miners who had to train him and who were therefore not fully available for production. The expenses incurred by the mines as a result of this high turnover can be computed easily. They amount to millions every month. In addition, a large number of miners change employment from one colliery to another. This is not included in the above figures of labor turnover, but is also a factor contributing to lower production.

It is known that there is a close connection between the unusually high number of miners who leave their profession and the housing shortage. So far, efforts to solve this problem have been extremely successful. In the period from the currency reform in 1948 to mid-1952, the bituminous coal industry invested more than 530 million DM in workers' homes. At the start of World War II, there were 329,827 miners' dwelling units in the territory of the present Federal Republic. Of these, 251,517 were damaged or destroyed during the war, leaving only 78,310 undamaged miners' dwellings at the end of the war. Between mid-1945 and 31 Dec 1951, 217,791 were restored, and another 44,038 were made available by new construction, subdividing, and rebuilding of attics. Thus, on 1 January 1952, the Federal Republic had 340,139 miners' dwelling units, or 16,312 more than at the beginning of the war. An additional 40,000 units were to be completed or had funds provided for their construction in 1952, bringing the total to 380,000 units. There is still a deficit of 80,000 units, since the number of miners (both surface and underground workers) in the territory of the Federal Republic has increased from 400,000 in 1938 to 500,000 in 1952.

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More than 25 percent of West German bituminous coal is extracted either fully or partially by machine (approximately 106,000 tons per workday). The coal is either broken from the face by machine and hauled out automatically, or broken manually with hammers and hauled out automatically. The "propless" mining method was developed during the war, but did not become practical on a large scale until after the war. Only 5 years ago, the successes achieved with this method would have been considered impossible. While the production of bituminous coal from fully and partially mechanized mines was 15,000 tons per workday in July 1948, this figure was raised to 33,000 tons in July 1949. At present, 267 mining installations are equipped with modern mining machinery. Scraping machines are producing 20,000 tons per day, and cutting machines about 25,000 tons per day, while 60,000 tons per day are produced by semimechanized installations. Thus, about 40 percent of the production from seams at flat incline is obtained by full or partial mechanization at the coal faces.

The progress achieved through mechanization at the face over a short period is considerable. At the middle of 1948, average daily production of fully and partially mechanized installations was about 300 tons, while the modern mines today show an average production of 400 tons.

Output per workday in fully and partially mechanized mines is much higher than in mines employing the old methods. In flat seams, forewinning amounts to 3.3 tons per man per day, while forewinning output in modernized coal faces is 4.2 tons per man per day. Production at modernized coal faces is 8.8 tons, while similar faces being worked by older methods produce on the average 6.8 tons. Thus, modernized coal faces produce about 30 percent more.

Production in all mines with flat seams (old and modernized faces together) is now about 8 tons per man per day. In January 1941, the average was 7.7 tons. Today's figure is thus about 4 percent higher. Furthermore, it must be borne in mind that the Ruhr collieries in 1941 was manned by experienced miners, so that many handicaps which are serious matters today were quite unknown then.

The share of mechanization in the production increase since 1948 is a good measure of the effect of mechanization. In determining this share, the amount produced by intensified mechanization (about 90,000 tons per workday) cannot be considered, since the faces where mechanization was intensified would have been producing anyhow. However, flat seams being worked by the old methods produce 216 tons per day at each working site, while modernized faces yield 400 tons. Mechanization thus means production of an additional 184 tons for each face. It must be pointed out that partial and full mechanization is carried out where deposit conditions are most favorable. It would probably be a close estimate to set the additional production of a mechanized face at 100 tons instead of 184 tons. While this estimate is conservative, it still means an additional production of 27,000 tons per day on the basis of 270 modernized coal faces. In addition, it must be considered that each 100 tons of coal mined in fully or partially mechanized installations means a saving of six cutters per shift, so that the 106,000 tons produced by mechanical means every day mean a saving of 6,400 cutters per shift. These men can be used elsewhere, and since they are highly skilled miners, they can produce another 2 tons of coal per shift. The 6,400 cutters per shift thus produce an additional 13,000 tons.

The contribution of mechanization to the increase in production can thus be set at 40,000 tons per workday. Considering the fact that mechanical removal of dross has been introduced, a measure which also saves valuable manpower, the figure can even be set at 45,000 tons.

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Mechanization has thus produced very encouraging results, and the investment in new equipment has proved to be fully justified. Expansion of mechanization, testing of new methods, and improvement of existing methods are contingent on the investment of large amounts of capital.

The question of whether a similar production increase could have been achieved without systematic mechanization is rather pointless. If that policy had been used, it would have necessitated the employment of additional manpower, which in turn would have necessitated an even more intensified housing program. Even if the means for this intensified housing construction had been available, it is doubtful whether the employment of additional miners would have resulted in a production increase of 40,000 to 45,000 tons per day, since the labor turnover is extremely high.

It is also to be noted that the increased use of mechanical means was an impetus to many people to enter the mining profession. This fact cannot be expressed statistically, but it is obvious that mechanization has had an advantageous effect on the labor situation. Mechanized coal mining will continue to be the most important part of short-term and medium-term production-increase programs.

So far as predictions covering the next few decades can be made, it seems that coal will be the most important basic raw material for the generation of electric power in the Federal Republic. As electric power plants require tremendous quantities of coal, and as nature has placed limits on the availability of coal, it must be used as economically as possible. According to the latest estimates, the certain and probable reserves of bituminous coal in the Federal Republic amount to 123.5 billion tons. Of the certain reserves of the Ruhr region (those extending to a depth of 1,200 meters), 34.2 billion are considered workable, and 14.4 billion tons conditionally workable. Thus, 75 percent of the certain reserves are workable and usable. On the basis of 75 percent of the reserves considered workable, and assuming a yearly production of 130 million tons, the certain reserves of the Federal Republic amounting to 67.2 billion tons will last 370 years.

The picture is much less favorable if we look at the reserves of the mines being operated today. These mines include 10.4 billion tons of workable reserves and 4.6 billion tons of conditionally workable reserves. On the basis of a yearly production of 130 million tons, they will last only another 70 years, or, if we add the conditionally workable reserves, 100 years.

Investigations carried out during the past few years have shown that a number of collieries in the heart of the Ruhr will have exhausted their deposits to such an extent within the next few years that they will be forced to shut down. A number of other collieries will have reached that state by 1990.

The collieries which have shut down must be replaced by new ones. This problem is made more urgent by the fact that the depth at which coal is found now is such that it will take about 15 years from the first stage of construction before a new colliery can show any sizable production.

The compact brown-coal region of the Lower Rhine basin contains reserves of about 60 billion tons. The brown-coal reserves available for production at present in the territory of the Federal Republic amount to approximately 6 billion tons, 5 billion tons of which are found in the Lower Rhine basin brown-coal field. These reserves will assure the economic open-pit production of brown coal for another 60 years. Experience of the past has shown, however, that technological developments will bring about an increase in the

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workable portion of the reserves. In the Lower Rhine field, 19 open-pit mines are operating at present; they produced 59,127,000 tons of crude brown coal between January and October 1952. Production was thus nearly 2 million tons above that of the same period of 1951.

By 1960, crude brown-coal production of the Federal Republic is to be approximately 107 million tons per year. While 23 million tons were used as fuel by thermal electric power plants in 1951, this figure is to reach 46 million tons in 1960.

The mines operating in the Ruhr today probably contain about one billion tons of so-called ballast coal in the form of impure seams. A yearly average of about 80 million tons should be available from conditionally workable seams. It will require on-the-spot investigations to determine to what extent mining of these seams along with the pure-coal seams will be technically and economically feasible. But even if only 10 percent of this quantity is found to be worth mining, it will still amount to 8 million tons per year.

On the basis of a yearly production of 130 million tons, it can be assumed that the bituminous coal mines of the Federal Republic will produce about 13 million tons of inferior-grade fuel (in terms of high-grade coal) per year. By adding the ballast coal mined from impure seams and deducting the quantities used by the collieries themselves, a total of 10 million tons of nonmarketable coal would be available for the production of electric current. This quantity of ballast coal could be used in modern thermal electric power plants to be built to produce about 25 billion kilowatt-hours per year.

The coal mining industry has been making efforts for years to utilize bituminous coal with too high an ash content and brown coal with too high a moisture content. These types of coal are not transportable and are used for production of electric power at the mining site. It is now possible to burn bituminous coal with an ash content of 35 to 40 percent in large boilers with an efficiency of 85 percent.

Electric power consumption in the Federal Republic is expected to double by 1960; this will require the production of an additional 50 billion kilowatt-hours per year. Of this additional amount of power required, 80 percent can be produced on the basis of brown coal and very low-grade bituminous coal.

According to plans of the OEEC, bituminous coal production in the Federal Republic is to be increased to 500,000 tons per day or 150 million tons per year by 1956. This goal requires investments of about 3.77 billion DM, of which one billion is needed for construction of new production capacities. The bituminous-coal-mining industry of the Federal Republic hopes to be able to raise 1.45 billion DM on its own. Even with investment aid by domestic trades and by the MSA, the plan is still 2 billion DM short, and the problem of raising this sum is still unsolved. Only one thing is certain: if the funds are not made available, the production goal cannot be met.

Brown-coal production is to be increased to 96 million tons per year by 1956; production of brown-coal briquettes, including pitch coal, to 18.7 million tons per year. To reach this goal, the brown-coal-mining industry of the Federal Republic requires investments in the amount of 667 million DM. The industry itself can raise 317 million DM, but so far no way has been found to raise the 280 million DM still lacking.

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According to a plan made by the coal-mining industry after the 1948 currency reform, production of bituminous coal is to reach the 1938 level by the end of 1953. This plan provided for investments in the amount of 1.65 billion DM by the end of 1951, of which 523 million DM were earmarked for miners' housing projects and 465 million DM for the brown-coal mining industry. Actually, however, only 1,079,000,000 DM were raised for the bituminous-coal-mining industry, and 319 million for brown coal. The investments in miners' housing projects until the end of 1951 amounted to 528 million DM. Of the above sums, 1,304,000,000 DM were raised by the industry itself. Thus, only about 73 percent of the planned investments could be realized. In view of the fact that the investment program fell more than 25 percent short of its goal, the production results achieved by the industry are considerable. However, it must be pointed out that the original aim of increasing production by increasing productivity was not realized, and that the increase in production in 1951 and 1952 was accomplished mostly by increasing the labor force.

The year 1953 is to bring the establishment of a common market for the Schuman-Plan countries. In the field of coal prices, a comparison shows that prices in the Federal Republic are much lower than in the other countries and even lower than the normal price which could be expected because of lower German production costs. The present threefold coal-price system of the Federal Republic, under which different rates are charged for export coal, inland use, and household use, will have to be scrapped when the common market comes into existence. To avoid an intolerable load on the coal-mining industry, which is already operating with too low a profit, this question must be settled, or the German coal-mining industry will enter into the common market with a great initial handicap.

The settlement of the price problem is of special importance in the matter of investments. It must be recalled that France has put her coal-mining industry into a position where it was able in 1951 to use 14.50 DM per ton of coal mined for maintenance of capital and new projects. Self-financing in this amounted to 6 DM per ton of coal. French coal-mining thus has been carefully prepared for entering into the common market. The German coal-mining industry, on the other hand, enters into the competition of the Schuman Plan with a serious handicap. The German coal-mining industry might be faced with compensation payments to Belgian mines in the amount of 60 million DM per year, and, if France also must be subsidized, this figure would reach 80 million DM. This load would be the heavier, the smaller the gap between the production costs of German coal and the "average costs of the Coal and Steel Community countries" which is to be determined by the High Authority. A very close examination of the problem will be required to determine how the initial conditions for the entrance of the German coal-mining industry into the common market can be improved.

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